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Tinen et al.

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[54] **CEILING GRID WITH BEVEL CONFIGURATION**

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[52] **U.S. Cl.** **52/506.07**; 52/656.9; 52/664; 52/762; 52/763; 52/778; 52/781

[58] **Field of Search** ..... 52/506.07, 656.9, 52/664, DIG. 8, 762, 763, 778, 781

[56] **References Cited**

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4,021,986	5/1977	McCall et al. .	
4,505,083	3/1985	Mieyal .	
5,265,393	11/1993	Bischel et al.	52/506.07 X
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[57] **ABSTRACT**

A suspension ceiling grid for supporting rectangular panels. The grid members are elongated runners with a generally inverted T-shaped cross-section. Flanges on the lower side of the runners have inclined exposed portions and vertical portions concealed by rabbeted edges of the panels. The flange portions are configured with respect to the proportions of the rabbeted panels, to appear as beveled edges of the panels whereby the finished ceiling appears to be gridless. The runners are specially notched and trimmed to provide a strong but attractive faux miter joint at their intersections.

13 Claims, 3 Drawing Sheets

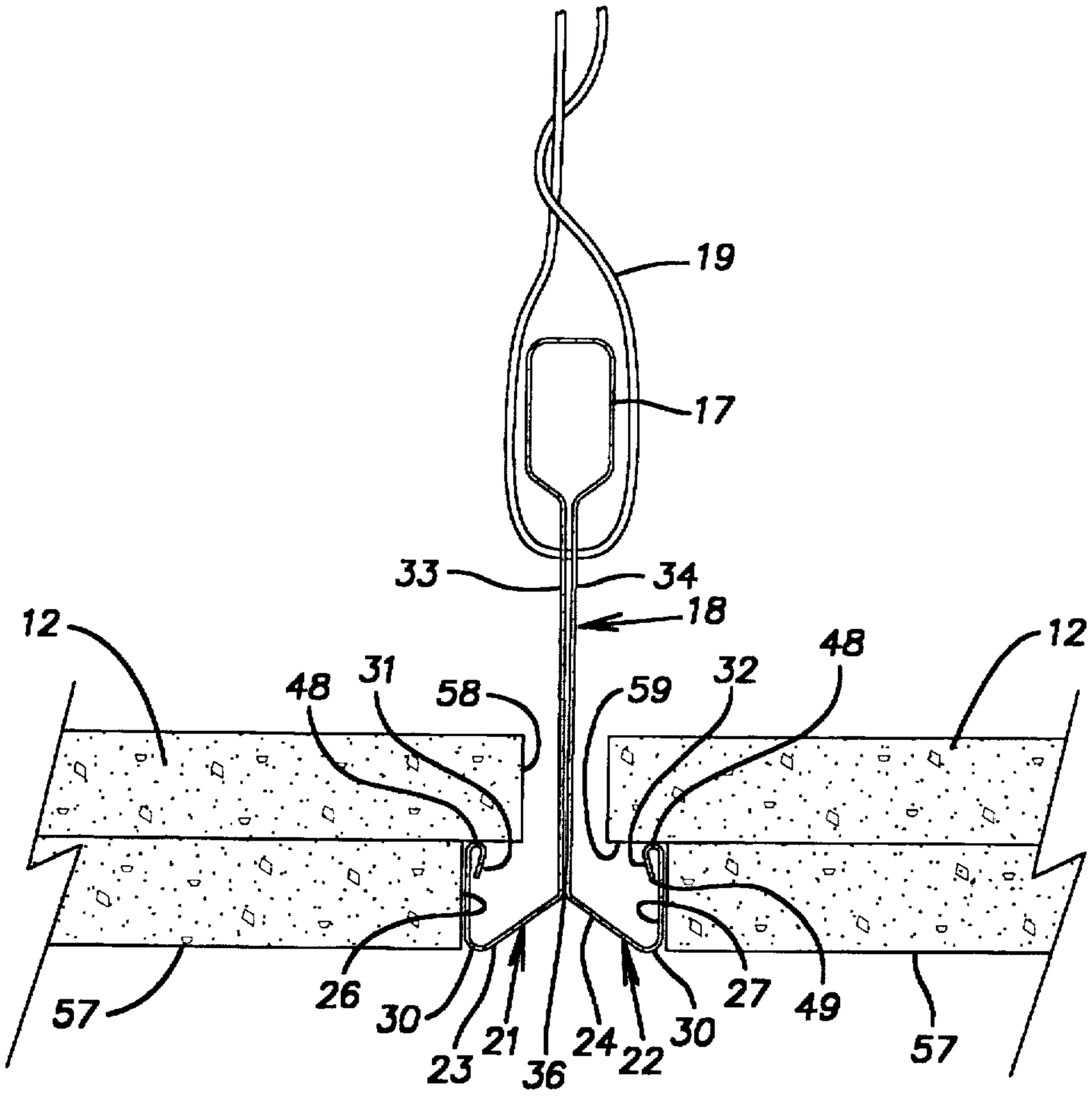


Fig. 1

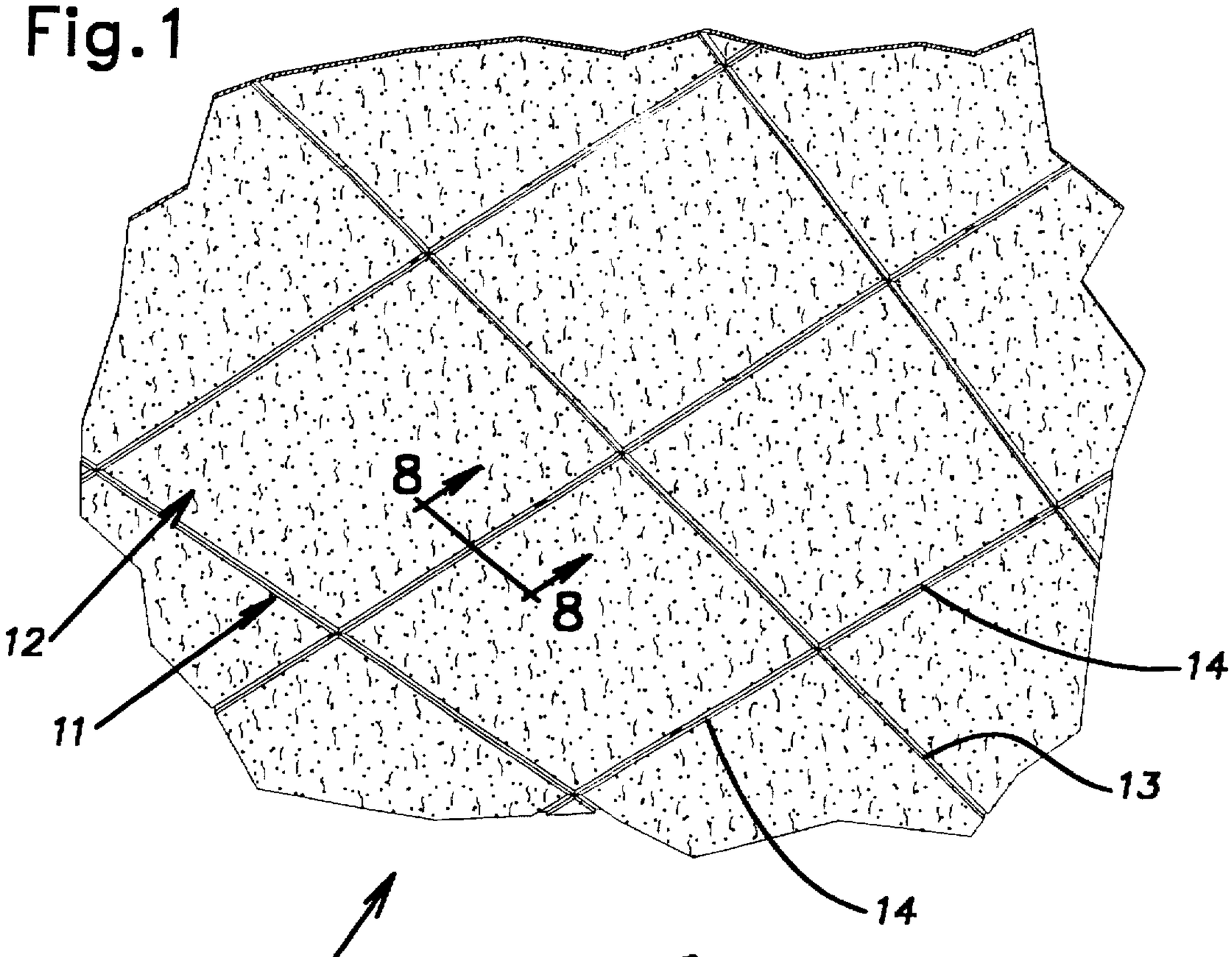
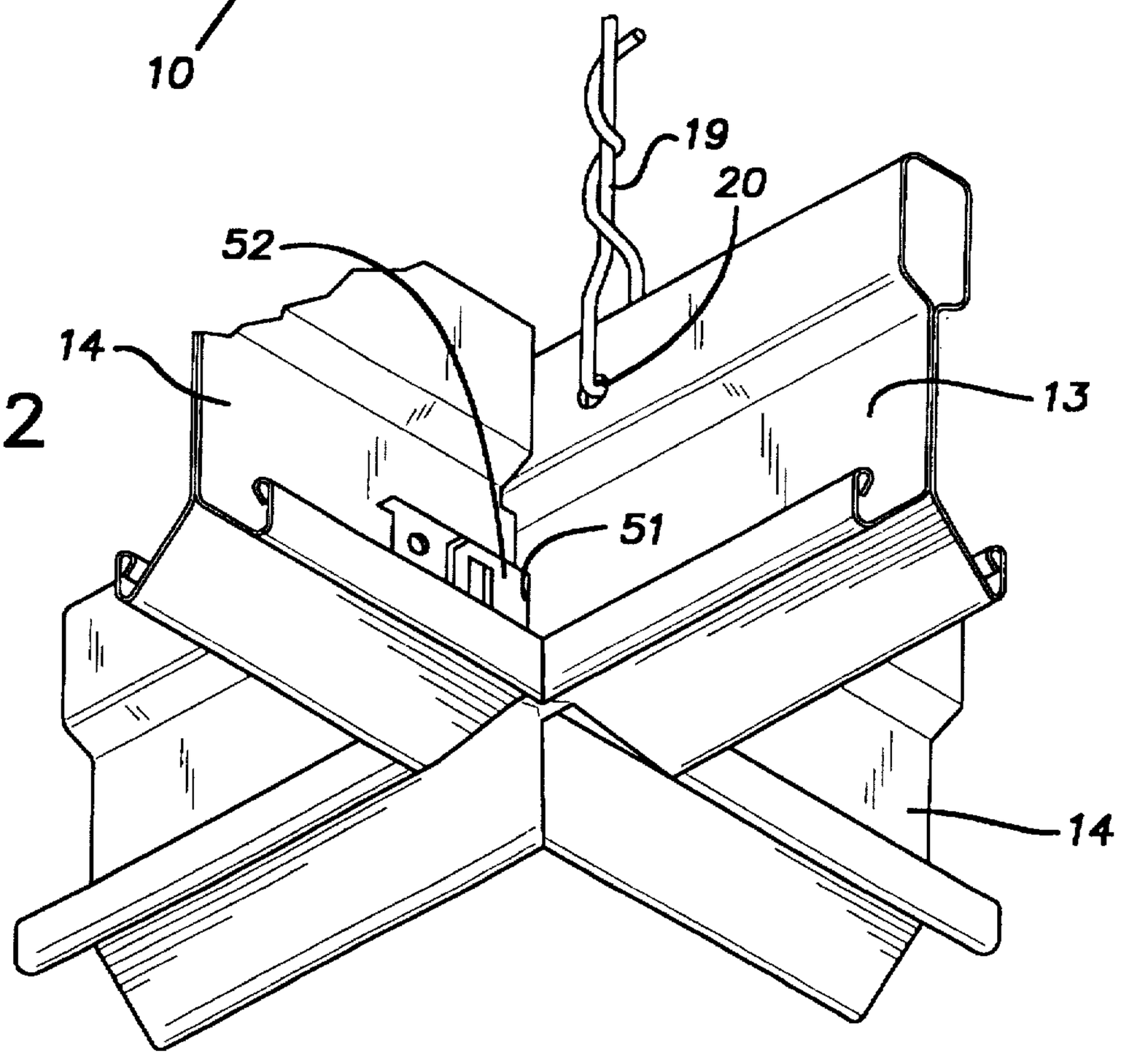


Fig. 2



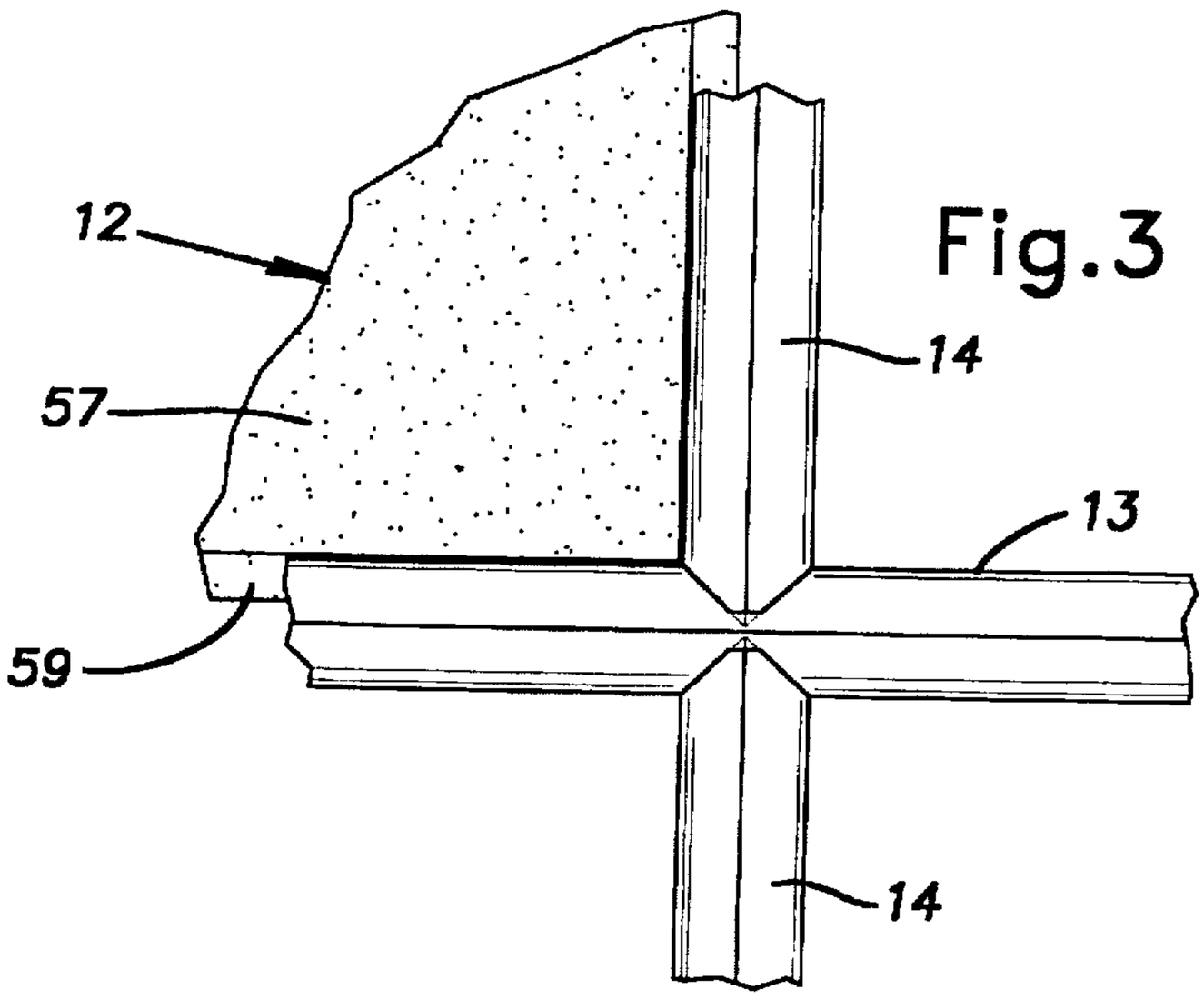


Fig.3

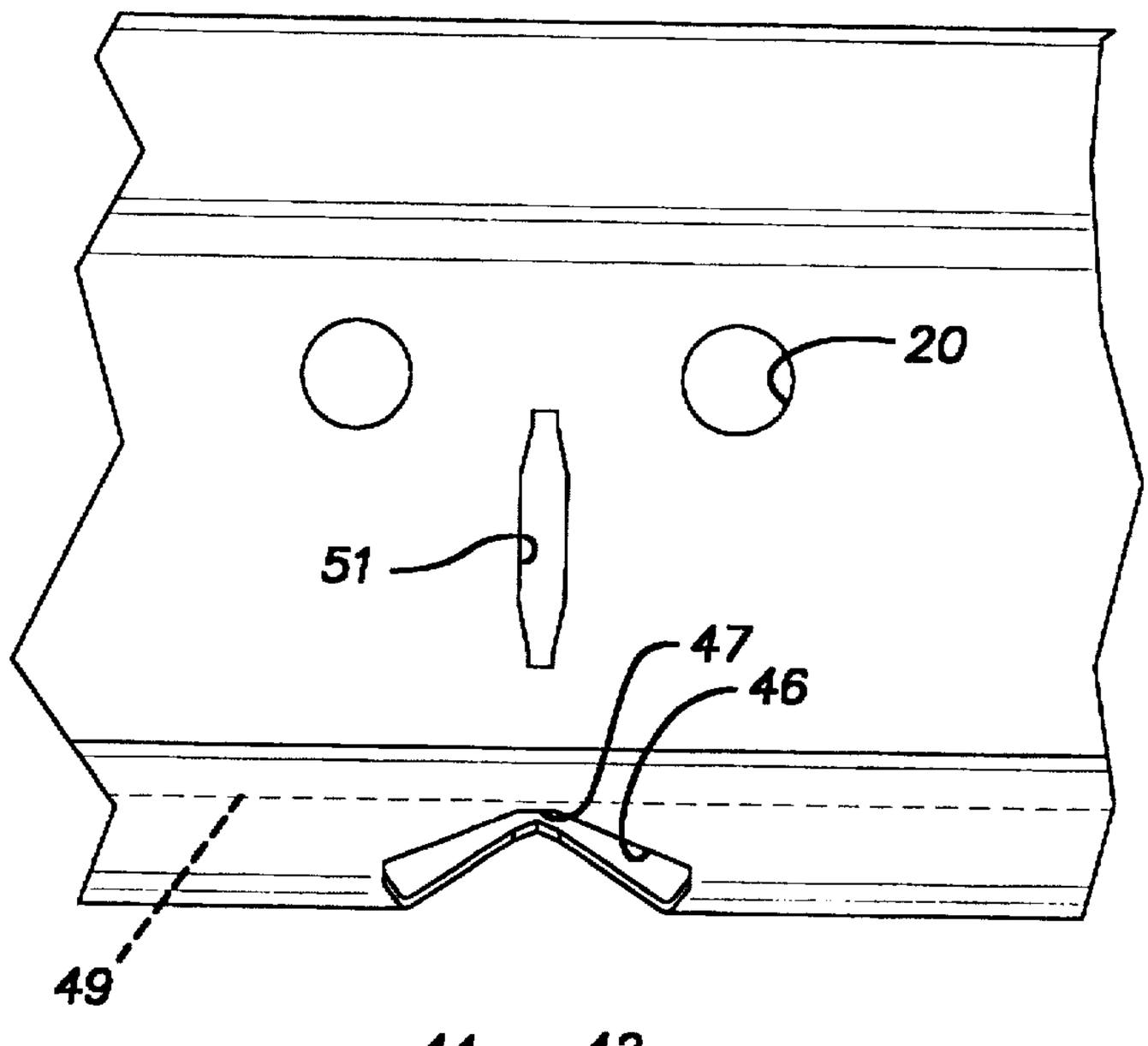


Fig.5

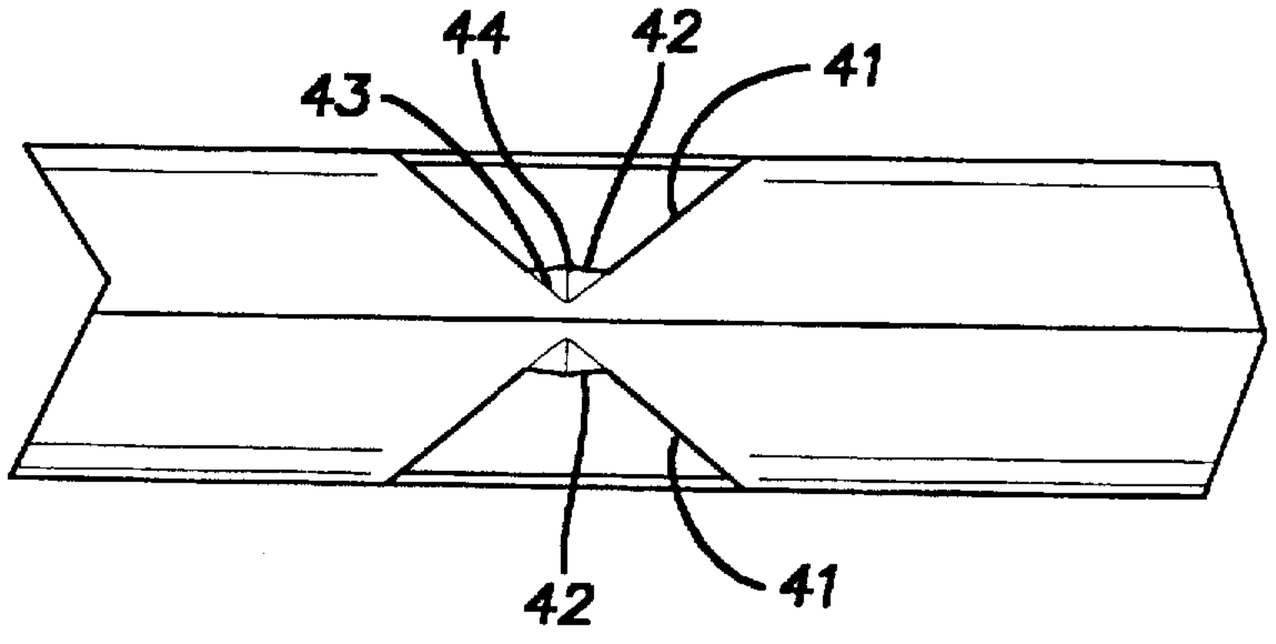


Fig.6

Fig.4

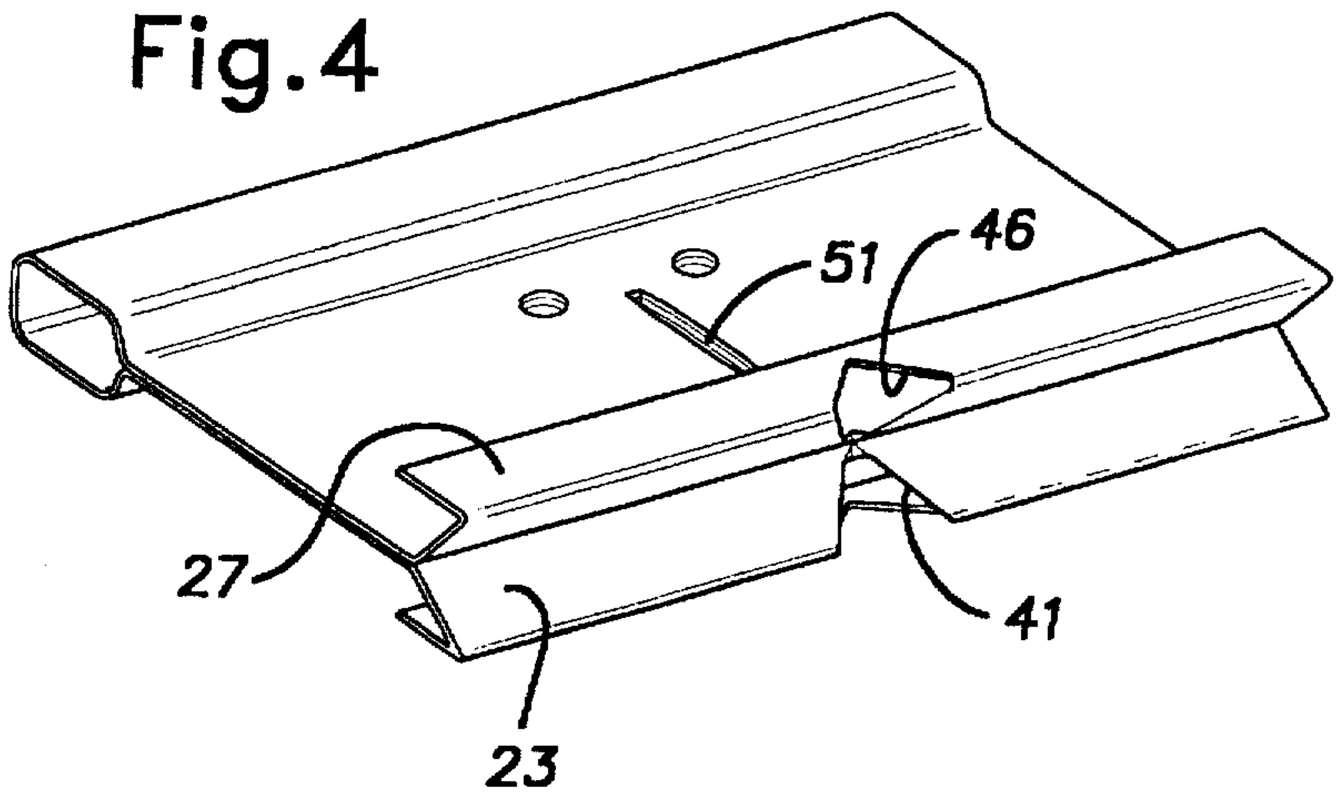


Fig.7

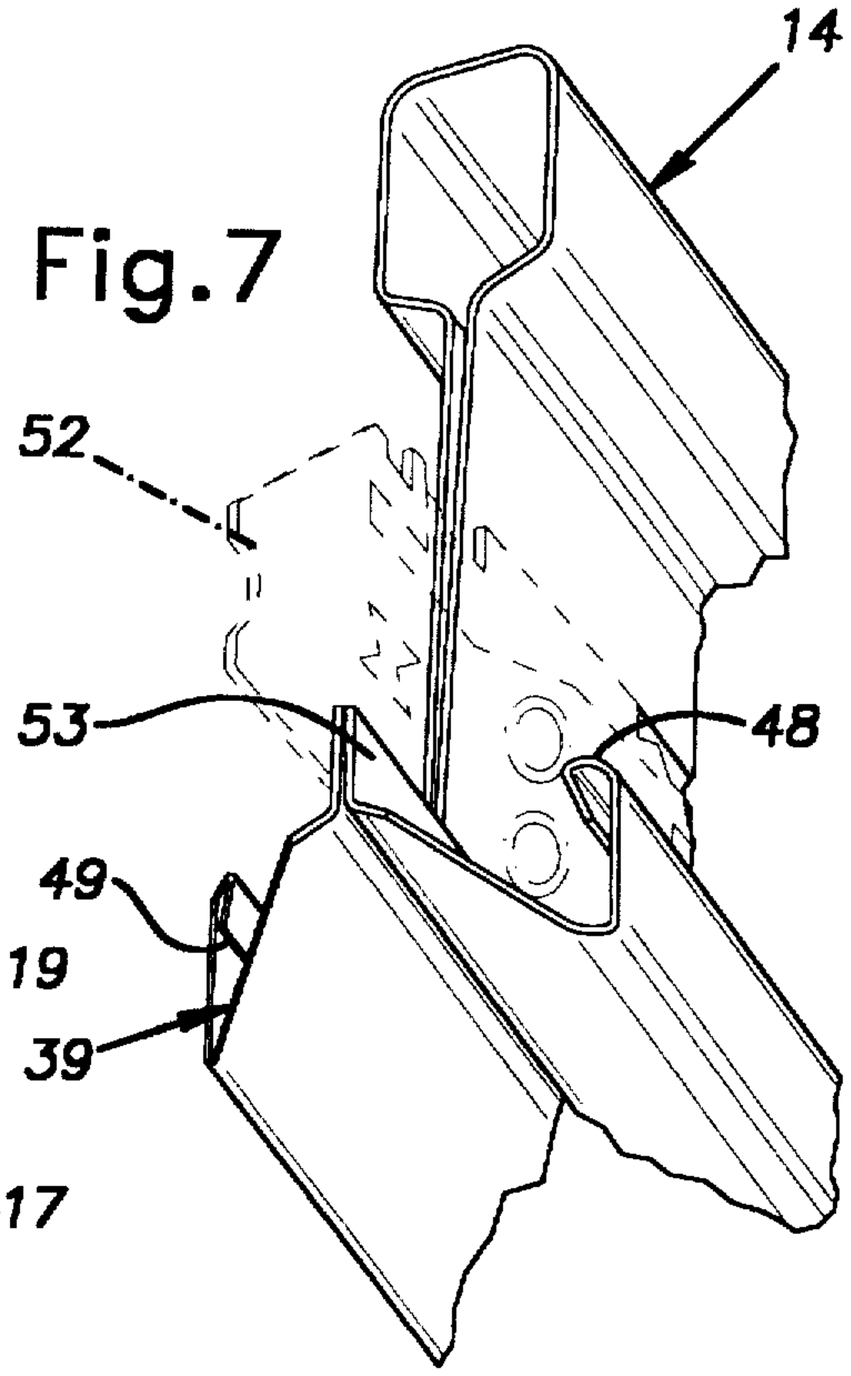
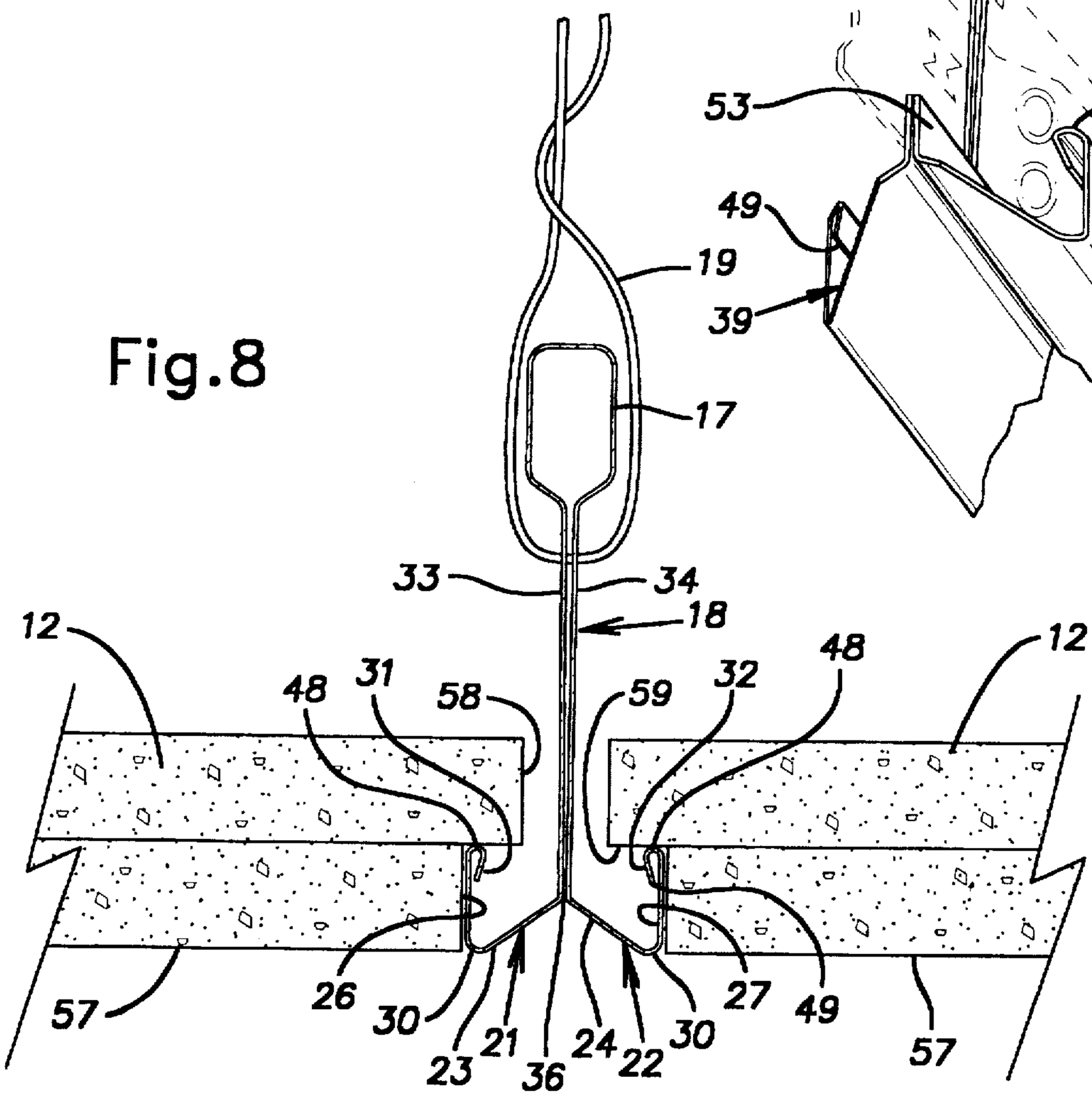


Fig.8



CEILING GRID WITH BEVEL CONFIGURATION

BACKGROUND OF THE INVENTION

Suspension grid systems typically provide grid members interconnected to form rectangular or square openings in which panels are positioned and supported. In most prior art grid systems, the grid members or runners are formed with a cross-section of an inverted "T" and provide a lower or exposed flat surface formed by the oppositely extending flanges on which the panels are supported. In such systems, the assembled grid and panels of the ceiling are a generally planar system in which the panels appear to provide a surface interrupted by a plurality of flat, relatively wide bands. Such systems are extensively used and a need exists for a suspension ceiling system that is distinctive from this common arrangement.

It is known to provide a generally T-shaped grid member with a downwardly open slot shaped to receive T-fasteners which can be positioned in the slot and used to support various equipment or fixtures. Such grid systems are often used in hospitals where patient privacy curtains or other equipment can be mounted on the T-fasteners. An example of such systems is illustrated in U.S. Pat. No. 4,021,986. U.S. Pat. No. 4,505,083 discloses grid runners having a longitudinal recess such as an inverted V-shaped channel in the lower exposed face of the runners and faux miter joints.

SUMMARY OF THE INVENTION

The invention provides a suspended ceiling grid construction that is configured to look like bevelled edges of the panels supported by the grid. The construction thus gives the illusion of a gridless ceiling. The bevelled detail can be used to compliment other architectural bevel features in a building to obtain an integrated motif. As disclosed, the grid is configured to lie flush with the plane of the visible face of rabbeted panels. This configuration contributes to the visual effect in which the grid is perceived to be part of the panels they support.

In the disclosed embodiment, the grid runners are formed of sheet metal rolled into a beam structure with a shape that is described generally as an inverted tee. The sheet metal is bent or folded in a profile symmetrical about a central vertical plane. At the lower part of the profile, the sheet stock diverges from the center plane into flanges that appear as the bevels of the associated panels. The seam between these diverging flanges gives the appearance of a joint between adjacent panels.

In another aspect of the invention, a faux miter joint between intersecting grid runners is formed while maintaining adequate lateral bending strength in a main or through runner. The disclosed flange geometry allows miter notches to be cut into the flanges while sufficient stock remains in these elements at locations that produce a relatively high bending moment of inertia or section modulus. A crease formed in the remaining visible flange material in the through runner transverse to its longitudinal axis improves the appearance of the faux miter joint by visually continuing the center plane seam of the intersecting transverse runners.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a view from below of a suspended ceiling embodying the invention;

FIG. **2** is a fragmentary perspective view from below of an intersection of grid runners constructed in accordance with the invention;

FIG. **3** is a fragmentary bottom view of an intersection of grid runners of the invention;

FIG. **4** is a fragmentary perspective view from below of a grid through runner;

FIG. **5** is a fragmentary side elevational view of the grid through runner;

FIG. **6** is a fragmentary bottom view of the through runner;

FIG. **7** is a fragmentary perspective view of an end of a cross-runner with an end connector shown in phantom; and

FIG. **8** is a cross-sectional view of the ceiling taken in the plane indicated at the line **8—8** in FIG. **1**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the figures, there is illustrated a suspended ceiling **10** which comprises a ceiling grid system **11** and ceiling panels **12** supported on the grid. The panels **12**, as is conventional, are generally flat and rigid. The grid system **11** includes main or through runners **13** and lateral or transverse runners **14**. When installed, each of the runners **13**, **14** has a cross-section that can be generally described as an inverted T-shape. At the top of its cross-section, each runner **13**, **14**, in the illustrated case, has a stiffening bulb or spine **17** which extends longitudinally at the top of a web element or portion **18**. The web portion **18** is generally vertically disposed in the installed condition of the respective runner **13**, **14**. The main or through runners **13** are supported from a structural ceiling by support wires **19**, for example, each extending through a selected one of apertures **20** provided in the webs **18** of the main runners **13**. Unitary with the web portion **18** at its lower edge are first and second oppositely extending flanges **21**, **22**. The flanges **21**, **22** extend longitudinally along essentially the full length of the respective runners **13**, **14**. Each of the flanges **21**, **22** includes an inclined generally planar portion **23**, **24** proximal to the web **18** and a generally planar vertical portion **26**, **27** distal from the web **18**. The flanges **21**, **22** further include an in-turned reinforcing lip **31**, **32**. The inclined portions **23**, **24**, vertical portions **26**, **27** and lip portions **31**, **32** of the first and second flanges **21**, **22**, respectively, are integral with one another. As shown, the flanges **21**, **22** are symmetrical with one another about an imaginary central vertical plane passing through the web portion **18**.

In the illustrated example, the inclined portions **23**, **24** of the flanges **21**, **22** rise from the horizontal at an angle of about 40°. The vertical portions **26**, **27** rise, from corners **30** with the respective inclined portions **23**, **24**, substantially higher than an imaginary horizontal plane where the inclined portions **23**, **24** intersect the web **18** and, it will be seen, at least the majority of the height of the flange lip portions **31**, **32** lie above this imaginary plane. The lips **31**, **32** serve to reinforce the vertical flange portions **26**, **27**.

Preferably, the stock for forming the runners **13**, **14** is sheet steel that is roll-formed into the illustrated generally T-shaped structure. When fabricated in this manner, the main body of the runners is unitary and the web **18** is comprised of two layers **33**, **34**. The layers **33**, **34** form a seam **36** between the inclined portions of the flanges **23**, **24**.

Commonly, a ceiling grid structure is constructed by suspending relatively long "main" runners in parallel rows. Typically, the main runners are long pieces, i.e. 12 feet in length, that are joined end-to-end to form of a continuous row. Between the main runners, cross-runners of a limited length are assembled into slots in the webs of the main

runners. The cross or transverse runners may have a length of, for example, 4 feet. 4 foot×4 foot grid modules formed by the main runners and the transverse runners can be divided into 2 foot×2 foot modules or 1 foot×1 foot modules or into rectangular modules by adding secondary cross runners. The main runners and primary and secondary cross runners can have webs of different height so as to provide sufficient vertical beam strength. Another known way of constructing a suspended ceiling is to assemble runners in a basket weave pattern. In either the main runner/cross runner construction or in the basket weave construction, there is a "through" runner that runs through an intersection and opposed cross or transverse runners that abut the through runner at a common intersection from opposite sides of the through runner. The terms main or through runner are used interchangeably herein to designate the runner which passes through an intersection and the terms cross or transverse runners are used to designate runners which abut a main or through runner but which do not pass continuously through an intersection.

The invention provides a faux miter joint at intersections between the main or through runner **13** and opposed cross-runners **14** as best shown in FIGS. **2** and **3**. At the mitered joint, the through runner is cut or notched through its flanges **21**, **22** to receive ends **39** of the cross-runners **14**. The notches or holes **41** have a generally triangular configuration both in the plane of the inclined portion **23**, **24** of the respective flange and in the vertical portion **26**, **27** of the respective flange. A triangular zone or area **41** of the hole or notch in the inclined flange portion **23**, **24** has its apex truncated at **42** to leave material or stock **43** in the inclined flange portion **23** immediately adjacent the seam **36**. This material stock **43** leaves the through runner **13** with lateral bending strength in this area. The material stock **43**, on both sides of the seam **36**, is stamped or otherwise formed with a transverse crease **44**. The transverse crease **44**, which lies in a horizontal plane on both sides of the seam **36**, enhances the illusion of a true miter by continuing the sight line of the seams **36** of the cross-runner ends **39**.

A triangular portion **46** of the hole or notch in the vertical flange portions **26**, **27** extends, preferably, vertically above an imaginary horizontal plane through the intersection of the inclined flange portions **23** with the web **18**. Preferably, however, an apex **47** of this triangular portion **46** lies a substantial vertical distance below an upper edge **48** of the vertical flange portion **26**, **27**. It will be understood that, ideally, the apex **47** is slightly below a lower edge **49** of the respective reinforcing lip **31**, **32**. This assures that the reinforcing lips **31**, **32** are not diminished in their strengths by the presence of a part of the notch portion **46**.

A vertically elongated hole **51** is punched through the web **18** at an imaginary vertical plane transverse to the web **18** and bisecting the triangular notch portions **41** and **46**. The hole **51** receives end connectors **52** assembled or otherwise formed on ends **39** of the cross-runners **14**. The connectors **52** may be of the type disclosed in U.S. Pat. No. 5,517,796 or of other known types.

The ends **39** of each of the cross-runners **14** are trimmed to fit the miter notch area **41**, **46** in the through runner **13**. As shown in FIG. **7**, the inclined flange portions **23**, **24** at the cross-runner end **39** extend beyond remaining parts of the cross-runner except for the connector **52** and a small vertical remainder **53** of the web layers **33**, **34** above the plane of intersection of the inclined flange portions **23**, **24** and the web **18**. This small vertical remainder **53** ensures that the adjacent area of the seam **36** when viewed from below is uniform in appearance along the full length of the cross-runner **14** and minimizes the risk that a gap could form or be perceived at the seam area at the cross-runner end **39**. The vertical remainder **53** is accommodated by the height of the apex **47** of the triangular notch portion **46**. Assembly of the connectors **52** into the hole **51** is described in aforementioned U.S. Pat. No. 5,517,796.

Study of FIG. **8** shows the relationship of rabbeted panels **12** assembled in and supported by the grid **11**. The panels **12** have a lower planar visible face **57** surrounded by a rabbeted peripheral edge **58**. The edges have a face or shelf **59** that is recessed vertically above the visible face **57** a distance generally equal to the vertical height of the second flange portion **26**, **27**. The visible faces **57** are proportioned to fit relatively closely in the space between opposed second flange portions **26**, **27** of parallel spaced grid runners so that the second flange portions **26**, **27** are concealed by the panels **12** and the first flange portions **23**, **24** of the runners **13**, **14** appear as beveled edges of the panels. This illusion is augmented by the fact that a lower extremity of the runners **13**, **14** formed at the juncture of the inclined flange portion **23**, **24** and vertical flange portion **26**, **27** is generally coplanar with the plane of the lower visible face **57** of the panels **12**.

The vertical height of the web **18** measured from the bulb **17** to its intersection with the inclined flange portion **23**, **24** is greater than that ordinarily found in standard grid tees and other known constructions. Such standard and other known constructions can be compared, for example, with the grid of the present invention by reference to, i.e. standardizing, the distance between the bulb and the visible face of the panel supported by the grid. As a result, the grid of the present invention can be made from lighter gage stock while providing the same beam strength.

It should be evident that this disclosure is by way of example and that various changes may be made by adding, modifying or eliminating details without departing from the fair scope of the teaching contained in this disclosure. The invention is therefore not limited to particular details of this disclosure except to the extent that the following claims are necessarily so limited.

What is claimed is:

1. A suspended ceiling grid system for supporting ceiling panels comprising elongated through runners and cross-runners each being roll formed of sheet metal and having a vertical web, lying in a vertical plane and having a lower edge, and panel supporting flanges integrally joined to the lower edge of the vertical web, the flanges extending laterally from opposite sides of the web and being symmetrical with respect to the web, the flanges each having a first portion extending downwardly and laterally outwardly from the plane of the web to a corner and a second portion extending generally vertically upwardly from the corner.

2. A suspended ceiling grid system as set forth in claim **1**, wherein the second portion of each flange extends vertically upwardly above an imaginary horizontal plane passing through an upward extremity of the first portion of each flange.

3. A suspended ceiling grid system as set forth in claim **1**, wherein said grid through runners have holes in said webs to receive connectors of intersecting grid cross-runners, the ends of said cross-runners having connectors received in the connector receiving holes of the through runner from opposite sides thereof.

4. A suspended ceiling grid system as set forth in claim **3**, wherein said first and second flange portions of said through runner are notched symmetrically with an imaginary vertical plane passing through said connector receiving hole, the

flanges of the cross-runners having ends cut to a shape to fit the notches of the flanges of the through runner.

5. A suspended ceiling grid system as set forth in claim **1**, wherein said second portions of said flanges each have a distal edge remote from its associated first portion and each have a reinforcing lip formed by a reverse bend adjacent its distal edge.

6. A suspended ceiling grid system as set forth in claim **5**, wherein said lip is between said second flange portion and said web.

7. A suspended ceiling grid system as set forth in claim **4**, wherein said second portion of said flange has a distal edge remote from its associated first portion and a reinforcing lip formed by a reverse bend adjacent the distal edge of said second flange portion, said notch in said second flange portion being configured to leave said reinforcing lip intact.

8. A suspended ceiling grid system as set forth in claim **4**, wherein the notches in said first flange portion are configured to leave a zone of material adjacent said web to maintain lateral bending strength.

9. A suspended ceiling grid system as set forth in claim **8**, wherein said through runner has a longitudinal axis and said zone of material is creased along a line transverse to the longitudinal axis of the through runner to appear as a continuation of a line between the flanges of the intersecting cross-runners.

10. A suspended ceiling grid system as set forth in claim **1**, wherein said first flange portion is generally planar.

11. A suspended ceiling grid system as set forth in claim **10**, wherein the plane of said first portion is at an inclination from horizontal of about 40°.

12. A suspended ceiling grid system as set forth in claim **4**, said cross-runners have end portions that are trimmed so that said webs are notched in a manner leaving a lower part of the web immediately above the flanges existing and the notches in the through runner are adapted to receive said lower part of the web of an intersecting cross-runner.

13. A suspended ceiling comprising a grid of intersecting runners that form rectangular openings, the grid being adapted to be suspended from a superstructure, and rigid, generally planar panels assembled in the rectangular openings, the runners being elongated members having a cross-section generally shaped as an inverted tee, the cross-section including a web in a generally vertical plane and a pair of symmetrical flanges adjacent a lower edge of the web and being disposed on opposite sides of the plane of the web and extending laterally in opposite directions, the flanges having a first portion extending downwardly and laterally outwardly from the plane of the web to a corner and a second portion with a vertical height extending generally upwardly from the corner to a panel supporting surface, said panels each having a lower visible face surrounded by a rabbeted peripheral edge, the rabbeted edges being recessed vertically above the visible face a distance generally equal to the vertical height of the second flange portion of the runner, the visible faces of the panels being proportioned to fit relatively closely in a space between opposed second flange portions of parallel spaced grid members whereby the second flange portions are substantially fully concealed by the panels and the first flange portions of the runners appear as beveled edges of the panels.

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